# 4.9

## Combining Functions

**Sum, Difference, Product, and Quotient of Functions:** Let *f* and g be two functions with intersecting domains. Then for all values of *x* in the intersection, the algebraic combinations of *f* and g are defined by:

**Sum:** $(f + g)(x) = f(x) + g(x)$

**Difference:** $(f - g)(x) = f(x) - g(x)$

**Product:** $(fg)(x) = f(x)g(x)$

**Quotient:** $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$ provided $g(x) \neq 0$

See Examples 1 – 3 pgs. 140 – 143

See Example 4 pg. 146.

**Composition of Functions**: Let *f* and g be two functions such that the domain of *f* intersects the range of g. The composition of g denoted $f \circ g$, is defined by the rule

$$f \circ g(x) = f(g(x)).$$

The domain of $f \circ g$ consists of all *x*-values in the domain of g that map to g(*x*) values in the domain of *f*.

See Examples 5 – 8 pgs. 148-150